region of the layer **110** is left unattached from the substrate **120**. The attached region of the layer **110** directly adjacent to this unattached region is defined as the attachment points **112**. The attachment points **112** may also be defined during the manufacturing of the layer **110** and the substrate **120**. For example, the substrate **120** may be manufactured with attachment geometry (e.g. a hole) and the layer **110** may be manufactured with a reciprocating attachment geometry (e.g. a post). Upon attachment of the layer **110** to the substrate **120**, the attachment geometry is engaged, attaching the layer **110** to the substrate **120** and defining the attachment points **112**. However, any other method suitable to defining the attachment points **112** may be used.

[0027] The attachment points **112** preferably define the perimeter of the particular region **113** into a shape selected from (1) a substantially circular region (shown in FIG. **4**) that preferably results in a dome-like deformation, (2) a rectangular region (shown in FIG. **5**) that preferably results in a ridge-like deformation, (3) a square region (not shown) that preferably results in a square shaped deformation, such as those seen in keyboards, (4) a ring-like region (as shown in FIG. **6**) that preferably results in a ridge-like deformation in the form of a ring, and/or any other suitable shape for the particular region **113**. As the cavity **125** is deformed by the displacement device **130**, the particular region **113** is deformed. The particular region **113** is preferably adjacent to the cavity **125** and/or partially defines the cavity **125**, allowing deformation of the cavity **125** to directly deform the particular region **113**, but may alternatively be located in any other suitable location. Because the particular region **113** is located adjacent to the cavity **125**, the location of the attachment points **112** relative to the cavity **125** have a direct effect on the shape of the deformation of the particular region **113**. As shown in FIGS. **7***a* and **7***b*, the attachment points **112** at first positions that are closer to the center of the cavity **125** may lead to a dome-like deformation with a first diameter along the surface **115**. As shown in FIGS. **8***a* and **8***b*, attachment points **112** at second positions that are farther away from the center of the cavity **125** than the first positions, may lead to a dome-like deformation with a second diameter along the surface **115** that is larger than the first diameter. As shown in FIGS. **9***a* and **9***b*, attachment points **112** at third positions that are closer to the center of the cavity **125** than the first positions may lead to a dome-like deformation with a third diameter that is smaller than the first diameter. The described attachment points may also lead to dome-like deformations with a first, second, and third height respectively and/or a first, second and third curvature respectively that may be adjusted by varying the level of deformation caused by the displacement device **130**. For example, if the level of deformation or level of change in fluid volume caused by the displacement device **130** is constant, because the deformation or fluid of the cavity is spread over a larger surface area in the variation shown in FIGS. **8***a* and **8***b* and spread over a smaller surface area in the variation shown in FIGS. **9***a* and **9***b*, the tactile feedback felt by the user from the particular region **113** in the variation shown in FIGS. **8***a* and **8***b* is of a softer surface than that felt in the variation shown in FIGS. **9***a* and **9***b*.

[0028] The attachment points **112** may also be located along the wall of the cavity **125** at an "depth" lower than the rest of the layer **110**. The attachment points **112** are preferably symmetric relative to the center of the cavity **125**, but may alternatively be asymmetric relative to the center of the cavity **125**. However, the attachment point **112** may be located in any other location and/or arrangement suitable to achieve the desired shape and feel for the deformation of the particular region **113**.

2. Second Preferred Embodiment

Geometry

[0029] The second preferred embodiment utilizes geometry of the layer **110** in relation to the attachment points **112** to control the shape of the deformation of the particular region **113**. The attachment points **112** of the second preferred embodiment are preferably similar or identical to those of the first preferred embodiment. The geometry of the layer **110** in relation to the attachment points **112** preferably create regions of higher pliability and regions of lower pliability. As the cavity **125** is expanded, the particular region **113** is deformed to accommodate for the adjusted volume and pressure. The regions of higher pliability will deform (e.g. stretch, bend, and/or compress) more while the regions of lower pliability will deform less. The implementation of certain combinations of regions of relatively higher pliability and regions of relatively lower pliability along the layer **113** allows for the control of the shape of the deformation of the particular region **113**. Implementation of such regions is preferably achieved in one of several variations.

2.1 Second Preferred Embodiment

First Variation

[0030] In a first variation of the second preferred embodiment, as shown in FIGS. **10***a* and **10***b*, the layer **110** includes a first portion **210** with a first thickness and a second portion **220** with a second thickness that is less than the first thickness. The surface **115** is preferably planar, thus the thickness is preferably "removed" from the side of the layer **110** opposite of the surface **115**, but may be "removed" from any other suitable portion of the layer **110** that does not cause the side of the layer **110** that defines the surface **115** to be noticeably non-planar. In this variation, the layer **110** is preferably of a homogenous or uniform material. The layer **110** may also include a third portion (not shown) of a third thickness that is less than the first thickness, but greater than the second thickness. The third portion may alternatively be of a varying thickness and functions as a transitional region between the first portion **210** and the second portion **220**. The third portion may alternatively function to provide additional control of the shape of the deformation of the particular region **113**. For example, in the variation wherein the deformation of the particular region **113** is a square-like deformation, the third portion may function to form a concave top surface, providing the user with a tactile indication of where to place their finger, similar that seen on a key of a keyboard. The second portion **220** effectively acts as a material with higher pliability than the first portion **210** and substantially biases the particular region **113** to deform at a higher degree at the second portion **220** than at the first portion **210**. The second portion **220** of the layer **110** may be located adjacent to the attachment points **112** (shown in FIG. **10***a*), resulting in a higher degree of deformation at the attachment points **112** (shown in FIG. **10***b*), but may alternatively be located closer to the center of the cavity **125** than the attachment points **112**, as shown in FIG. **11***a*, resulting in a lesser degree of deformation at the attachment points **112** and a higher degree of deformation at the second portion **220** of the layer **110**, as shown in FIG. **11***b*.